Multi-Hazard Mitigation Plan

5.0 Mitigation Strategy

This Multi-Hazard Mitigation Plan was originally created in 2005. In 2009 & 2012, the CPT reviewed and agreed to continue to adopt the original goals and objectives as noted in this section

The Community Planning Team (CPT) reviewed and discussed the process of formulating mitigation goals. Each CPT member was provided with a written explanation of Goals and Objectives, the purposes they serve, and how they are developed and written. Up to this point in the planning process, the CPT has been involved in talking to agencies and organizations and collecting and recording hazard related data. From these discussions and efforts, the CPT completed all three components of the Risk Assessment:

1. Hazard Identification;
2. Vulnerability Assessment; and
3. Capability Assessment.

The first two components have painted a picture of Metro's vulnerability to natural hazards. The CPT learned that:

1. Stream system and neighborhood flooding continues to be a significant threat to the community;
2. Geological hazards including landslides and sinkholes are a moderate threat;
3. Earthquakes pose a potential threat; and
4. Most meteorological and natural biological hazards occur periodically: drought, extreme temperatures, infestations, severe thunderstorms/high wind, tornadoes, and severe winter storms.

The third component, Capability Assessment, described the current ability of Metro to counter the identified threats through existing policies, regulations, programs, and procedures. Here, the CPT learned that:

1. Flood insurance is available, although only 3,733 policies are in effect, representing 37 percent of the 10,000 building footprints located within the floodplain;

2. Metro has an existing Floodplain Management Plan for Repetitive Loss Areas;

3. The stormwater regulations were recently updated to clarify and strengthen existing policies.

4. MWS has prioritized Capital Improvement Projects as outlined in the multiple Stormwater Basin Plans;

5. MWS has prioritized watersheds throughout the County for preparing/updating Basin Plans;

6. The IRC Building Codes contain seismic and design wind elements;

7. Residential plan reviews are performed on complex designs;

8. The NPDES water quality requirements may offer an opportunity to coordinate flood warning capabilities and stream gauging;

9. OEM has 73 Outdoor Early Warning sirens throughout the community. This siren program is currently (2012) in the process of being upgraded and additional sirens added to the footprint;

10. Public information is made available to inform residents about the risks of hazards (earthquakes, floods, and tornadoes, predominantly) and appropriate risk reduction actions that they can undertake. Social media outlets are also utilized along with Metro Government websites; and

11. Metro does not support flood protection and retrofitting as standard solutions for residential flooding problems.

GOAL SETTING

The analysis of the three components of the Risk Assessment identified areas where mitigation improvements could be made, providing the framework for the CPT to formulate planning goals. Each CPT member was provided an alphabetized list of possible goal statements. In addition, each CPT member also received a list of goals from other community plans that have had public input and review and have already been formally adopted by Metro. This information was provided to CPT to ensure that the Mitigation Planning Goals would be in concert, not in conflict, with other existing community priorities. CPT members then each received three index cards and were asked to write what they felt would be appropriate goals for this plan using the information provided as a guide.

The CPT members were instructed that they could use, combine or revise the statements provided, or develop new ones. The goal statements were then attached to the meeting-room wall, grouped into similar topics, combined, rewritten, and agreed upon.

Some of the statements were determined to be better suited as objectives or actual mitigation projects, and were set aside for later use. Based upon the planning data review, and the process described above, the CPT developed the final goal statements listed below. None of the final goal statements are the same as those provided on the alphabetized list. The goals and objectives provide the direction for reducing future hazard-related losses in Metropolitan Nashville - Davidson County.

GOAL #1: **Reduce exposure to hazard related losses for existing and future development.**

Objective 1.1: *Strengthen the existing flood hazard mitigation program.*

Objective 1.2: *Protect critical facilities, utilities, and infrastructure.*

Objective 1.3: *Improve the coordination of severe weather mitigation actions.*

Objective1.4: *Develop a coordinated set of mitigation actions that address geological hazards (earthquakes, sinkholes, and landslides).*

GOAL #2: **Promote awareness of hazards and vulnerability among citizens, business, industry and government.**

Objective 2.1: *Develop a seasonal multi-hazard public education campaign to be implemented annually.*

GOAL #3: Maximize use of available funding.

Objective 3.1: Identify multiple objective opportunities that can be used to support mitigation activities.

Objective 3.2: Identify and analyze project cost share options.

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Objective 3.3: Submit mitigation project applications annually at a minimum.

IDENTIFICATION OF MITIGATION MEASURES

This Multi-Hazard Mitigation Plan was originally created in 2005. In 2009 & 2012, the CPT reviewed and agreed to continue to adopt the original mitigation measures and recommended actions as noted in this section, with slight edits and updates as noted.

Following the goal setting meeting, the CPT conducted a brainstorming session to generate a set of viable alternatives that would support the selected goals. Each CPT member was provided with the following list of categories of mitigation measures:

- Prevention;
- Property Protection;
- Structural Projects;
- Natural Resource Protection;
- Emergency Services; and
- Public Information.

Potential mitigation measures within each of the six categories were presented to the CPT. (see Appendix A). A facilitated discussion examined and analyzed the alternatives. Then, with an understanding of the alternatives, the CPT generated a list of preferred mitigation actions to be recommended. Similar to the goal-setting activity, the CPT included all previously recommended mitigation actions from existing Metro mitigation plans in its review. This process reinforced Metro's use of the Multi-Hazard Mitigation Plan as an umbrella document for all exiting mitigation plans mentioned in Section 3. Thus, this plan puts forth existing recommendations that are still to be implemented in addition to the new recommendations that resulted from the CPT's detailed Risk Assessment process. This plan serves as an update to the existing mitigation plans by identifying the recommendations from previous plans that have already been implemented and by reprioritizing those that remain.

Once the old and new mitigation actions were identified, the CPT members were provided with decision-making criteria to prioritize the recommended actions. FEMA's recommended "STAPLE/E" criteria set (social, technical, administrative, political, legal, economic, and environmental criteria) was utilized in order to help decide why one recommended action might be more important, more effective, or more likely to be implemented than another.

With these tools, the CPT then undertook an exercise to prioritize the recommended mitigation measures. CPT members were provided with colored "stars": three red, three blue, and three green. Each color represented either high, medium, or low priority with regard to the importance, and each color was assigned a corresponding value (high = 5 points, medium = 3 points, and low = 1 point).

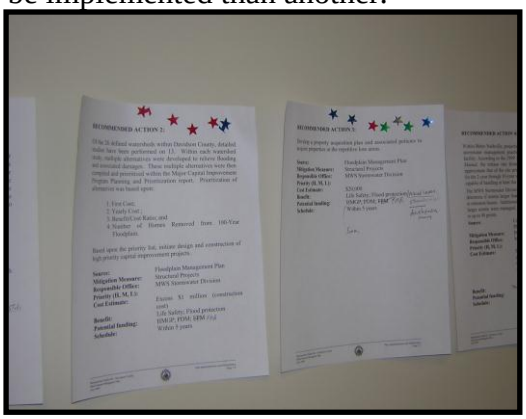

Figure 5.1 Priority "Stars"

CPT members then voted for their preferred mitigation measures by placing their "stars" on specific mitigation

measures. Team members were allowed to place as many as they wished of any or all colors on any one recommendation or to spread the stars among multiple mitigation actions. They were allowed to trade "stars", or otherwise negotiate with any other Team member, and they did not have to use all of their "stars" if they did not wish to do so. This process provided both consensus and priority for the CPT recommendations.

THE MITIGATION STRATEGY

The results of the planning process, the Risk Assessment, the Goal Setting, the Identification of Mitigation Measures, and the hard work of the CPT led to the Action Plan presented herein. It also helped the CPT clearly comprehend and identify the overall mitigation strategy that will lead to the implementation of the Action Plan.

All of the recommendations set forth fall into four easily identifiable strategies:

1. ENFORCE existing rules, regulations, policies and procedures. Communities can reduce future losses not only by pursuing new programs and projects, but also by paying closer attention to what's already "on the books."

2. EDUCATE the community on the hazard information that Metro has collected and analyzed through this planning process so that the community understands what disasters can happen, where disasters might occur, and what they can do to prepare themselves better. As part of public education, publicize the "success stories" that are achieved through the CPT's ongoing efforts.

3. IMPLEMENT the Action Plan, much of which is comprised of reiterating recommendations that have previously been made as a result of existing community plans.

4. MOM --- ardently monitor "Multi-Objective Management" opportunities, so that funding opportunities may be shared and "packaged" and broader constituent support may be garnered.

ACTION PLAN

The Action Plan presents the prioritized recommendations for Metro to pursue in order to lessen the vulnerability of people, property, infrastructure, and natural and cultural resources to future disaster losses. The recommendations are presented in order of priority to the community both in terms of need and effectiveness. The recommendations are also listed under the corresponding developed goal. Each recommendation includes a cost estimate and community benefit to meet the regulatory requirements of DMA. Action items that have already been completed or that were not recommended are included at the end of this section. *Action items may be out of numerical sequence due to action items being under different goals, moved to different areas, and/or being completed. Once an action item is assigned a number, it keeps it for tracking purposes.

GOAL #1:	**Reduce exposure to hazard related losses for existing and future development.**
Objective 1.1:	*Strengthen the existing flood hazard mitigation program.*
Objective 1.2:	*Protect critical facilities, utilities, and infrastructure.*
Objective 1.3:	*Improve the coordination of severe weather mitigation actions.*
Objective 1.4:	*Develop a coordinated set of mitigation actions that address geological hazards (earthquakes, sinkholes, and landslides).*

RECOMMENDED ACTION 1:

Of the 26 defined watersheds within Davidson County, detailed basin studies have been performed on 13. Within each basin study, multiple alternatives were developed to relieve flooding and associated damages. These multiple alternatives were then compiled and prioritized within the Major Capital Improvement Program Planning and Prioritization report. Prioritization of alternatives was based upon:

1. First Cost;
2. Yearly Cost;
3. Benefit/Cost Ratio; and
4. Number of Homes Removed from 100-Year Floodplain.

Based upon the priority list, the action plan recommends that Metro initiate design and construction of high priority capital improvement projects.

Source:	Floodplain Management Plan
Mitigation Category:	Structural Projects
Responsible Office:	MWS
Priority (H, M, L):	High
Cost Estimate:	Excess $1 million (construction cost)
Community Benefit:	Life Safety; Flood protection
Potential funding:	HMGP; PDM; FMA
Schedule:	Within 5 years

2009 Update: *Since the creation of this plan in 2005, Metro has initiated a new Stormwater fee where as of July 1, 2009, Stormwater has a dedicated funding source. With this funding, the plan is to continue the home buyout program at $1M/year, plus construct $12M/year in drainage improvements. Stormwater has a master project list that is being constantly updated as new stormwater projects are identified. This list will be ranked and will be used as the plan for making capital improvements to the stormwater system.*

RECOMMENDED ACTION 2:

Communities often prohibit critical facilities or hazardous uses from the floodway or the entire floodplain. While a building may be considered protected from the 100-year flood, a higher flood or an error on the builder's or operator's part could result in a greater risk than the community is willing to accept. If a critical facility must be located in a floodplain, then it should be designed to stringent protection standards and have flood evacuation plans. Metro does not currently have any special provisions for critical facilities.

The CPT recommends that ordinance language to provide added protection for critical facilities and prohibit hazardous materials and public health hazards from the floodplain is drafted, circulated for review and adopted.

Source:	Community Rating System Action Plan
Mitigation Category:	Prevention
Responsible Office:	MWS; Metro Planning; Metro Codes
Priority (H, M, L):	High
Cost Estimate:	Staff Time; Five to ten days of staff time to get the regulation adopted. Enforcing the new standard would be part of ongoing permit enforcement work.
Community Benefit:	Critical facility protection
Potential funding:	Existing Budget
Schedule:	Within 2 years

2009 Update: *A flood response plan was completed in 2009 for Mill creek. OEM will continue to work on more flood response plans in coordination with MWS and NWS.*

2012 Update: *In response to and per situations evidenced during the May 2010 flood event, Metro Water Services is systematically evaluating key infrastructure locations and making certain retrofits to address flooding impact potentials so as to eliminate or minimize operational disruptions during future "flood of record" flood events.*

RECOMMENDED ACTION 3:

A community flood response plan must specify steps to be implemented when a flood warning is issued, such as when and which streets to close, when to order an evacuation, when and what equipment should be moved to high ground, etc.

The Mayor's Office of Emergency Management (OEM) should review the costs and benefits of preparing a detailed flood response plan that identifies specific actions to take at different flood level predictions.

Source:	Community Rating System Action Plan
Mitigation Category:	Emergency Services
Responsible Office:	OEM
Priority (H, M, L):	High
Cost Estimate:	$25,000 or less
Community Benefit:	Effective, coordinated response, reducing losses, eliminating gaps and duplications in response activities
Potential funding:	FMA, HMGP, Existing Budget
Schedule:	Within 3 years

2009 Update: *A flood response plan was completed in 2009 for Mill creek. OEM will continue to work on more flood response plans in coordination with MWS and NWS.*

RECOMMENDED ACTION 4:

Metro Nashville's Special Flood Hazard Areas include 107.9 river miles of approximate A Zones, where FEMA did not provide base flood elevations. Most of these areas are slated for studies that will provide flood elevations and floodways.

The studies underway in the approximate A Zones should be completed and adopted into Metro's floodplain regulations. The studies should then be submitted to FEMA with a request to revise the FIRM.

Source:	Community Rating System Action Plan
Mitigation Category:	Prevention
Responsible Office:	MWS
Priority (H, M, L):	Medium
Cost Estimate:	Approximately $1,500 per river mile of each approximate A Zone
Community Benefit:	Life Safety; Regulating development to a defined flood elevation
Potential funding:	CTP; HGMP; PDM; USACE
Schedule:	Within 5 years

2009 Update: *MWS has a meeting scheduled in October 2009 with the State NFIP Coordinator and FEMA's contractor to perform a needs assessment on streams in Davidson County that are in need of a restudy. Converting the un-numbered "A" zones to detailed studies will be on the needs list.*

RECOMMENDED ACTION 5:

Develop a property acquisition plan and associated policies to acquire properties in the repetitive loss areas.

Source:	Floodplain Management Plan
Mitigation Category:	Property Protection
Responsible Office:	MWS
Priority (H, M, L):	Medium
Cost Estimate:	$20,000
Community Benefit:	Life Safety; Flood protection; Reduced losses; Development of greenway; stormwater management
Potential funding:	HMGP; PDM; FMA
Schedule:	Within 5 years

2009 Update: *MWS is in the final stages of developing an acquisition plan for floodplain properties.*

RECOMMENDED ACTION 6:

OEM has installed and continually updates a software program (E-Stat) that provides contact information and the geographical location of the following facilities within the Metro area: Title III facilities, critical facilities, and service facilities such as Metro ECC, Metro Fire Stations, NES, MWS facilities, Metro Police precinct stations, hospitals, nursing homes, schools, and daycares.

WebEOC is a software program with required associated hardware, LCD Panels and projectors. WebEOC will provide emergency management checklists during EOC activation. It will also provide real time multi-media with plotted incident sites and damage / impact areas based on Computer Aided Dispatch (CAD) data and field reports.

Fund, acquire, and install appropriate hardware and software.

Source:	OEM Local Hazard Mitigation Plan
Mitigation Category:	Emergency Services
Responsible Office:	OEM
Priority (H, M, L):	Medium
Cost Estimate:	Approximately $25,000
Community Benefit:	Modeling would allow fit-gap analysis to determine optimum solutions; maximize efficiency in response and recovery activities; forecast and prioritize problem areas
Potential funding:	Public-Private partnerships
Schedule:	Within 2 years

2009 Update: *OEM has purchased and is actively utilizing WebEOC within the local Emergency Operations Center.*

2012 Update: *OEM is moving to utilize LEO, a free on-line FBI program, in place of WebEOC. WebEOC will continue to be updated and kept as a back-up to the LEO program. OEM does not utilize E-Stat anymore. P-1 is the newest computed aided dispatch and has common places noted for dispatch information.*

RECOMMENDED ACTION 7:

Channels and detention basins can lose their carrying capacities due to debris accumulation, sedimentation, and the growth of vegetation. This loss may be prevented through the enforcement of regulations that prohibit dumping in streams and other portions of the drainage system. Regulations should:

- Prohibit dumping ANY material in a channel or basin that could cause an obstruction to flows. Ordinances prohibiting pollutants or causing nuisances are not sufficient by themselves;
- Identify of an officer or office responsible for enforcement and monitoring compliance; and
- Include provisions for penalties and abatement of violations.

The Metro Department of Law should draft stream-dumping regulations.

Source:	Community Rating System Action Plan
Mitigation Category:	Prevention; Natural and Beneficial Functions
Responsible Office:	MWS; Metro Legal
Priority (H, M, L):	High
Cost Estimate:	Two to three days for developing the ordinance and procedures. The cost of enforcing the regulations is not included here, as that would be dependent on the number of violators.
Community Benefit:	Maintaining a stormwater drainage system that operates at design capacity
Potential funding:	Existing Budget
Schedule:	Within 5 years

2009 Update: *Nothing new to report at this time.*

2012 Update: *Metro currently addresses the issues identified in Action 7 as outlined below:*

1. *Metro Codes regulates general refuse dumping within Metro to include such incidents in or near drainage conveyances. This includes mandating the removal of such material by the responsible party.*
2. *Metro Stormwater works closely with Metro Public Works to educate the public on proper locations (not in ditches, etc.) to stage landscaping debris for pick-up.*

Public Works also facilitates right-of-way refuse removal assistance in certain situations.

3. *Metro Stormwater in certain circumstances will facilitate the removal of accumulated material within the drainage system that represents a localized flooding risk.*
4. *Metro Stormwater in certain circumstances will facilitate the removal of dumped material within the drainage system that represents a localized flooding risk – if the responsible party cannot be identified/required to remove material.*
5. *Metro Stormwater enforces certain floodplain provisions in the Metro Stormwater Management Manual that require "cut and fill" material be balanced within designated floodplain areas.*
6. *Metro Stormwater mandates the performance of certain post development Best Management Practice maintenance activities (per the Metro Stormwater Management manual) by responsible parties. Stormwater works with the parcel owner/manager to facilitate that required maintenance is performed in a timely fashion. Stormwater has the authority to enforce that such maintenance actions are performed.*

RECOMMENDED ACTION 9:

The MWS Stormwater Division's drainage maintenance section currently removes debris and obstructions in response to complaints and reports of problems. Although staff is increasing, there are not enough people to inspect the entire drainage system once a year. There is also no written set of procedures.

The MWS Stormwater Division should review the costs and benefits of formalizing Metro's inspection and maintenance program to include detention facilities as well as streams and ditches.

Source:	Community Rating System Action Plan
Mitigation Category:	Structural Projects
Responsible Office:	MWS
Priority (H, M, L):	Medium
Cost Estimate:	The entire drainage system would need to be mapped, streams and basins deserving of annual inspections and maintenance would need to be identified, and procedures would need to be written and approved. The total cost of removing small obstructions found by more frequent inspections before causing a problem would be less than removing large obstructions later. Five (5) days of staff time.
Community Benefit:	Life Safety; Property Protection; Pro-active approach to flood mitigation; FEMA eligibility
Potential funding:	Existing Budget
Schedule:	Within 5 years

2009 Update: *MWS's inspection program does include detention ponds and water quality devices. MWS has initiated an inspection program for these facilities and devices.*

RECOMMENDED ACTION 10:

The CPT determined that geological hazards were adequately prevented in subdivision development through the designation of critical lots. Lots are designated critical during the preliminary plat review process based on soil conditions, degree of slope or other lot features, and to address concerns relating to the feasibility of construction. In order to determine the best method for addressing geological hazards, it is recommended that geological hazard ordinances from communities similar to Metro be identified, collected, and reviewed as part of the process of modifying the critical lot concept. However, outside of subdivision development, the critical lot concept is not utilized.

It is recommended that the definition of a critical lot be expanded to include specific geological details and defined subjectively during plat review and that the critical lot concept be used in review of other developments.

Source:	Community Planning Team
Mitigation Category:	Prevention
Responsible Office:	MWS; Metro Codes, Metro Planning
Priority (H, M, L):	Medium
Cost Estimate:	Staff Time
Community Benefit:	Life Safety
Potential funding:	Existing Budget
Schedule:	Within 3 years

2009 Update: *This will be re-addressed to create procedures for Metro Codes in regards to what gets flagged as critical lots with all parties, and to consolidate with what is flagged with Stormwater Division.*

RECOMMENDED ACTION 11:

Current NFIP riverine regulatory standards require that new residential buildings in the Special Flood Hazard Area (SFHA) have their lowest floor at or above the base flood elevation. Non-residential buildings may be flood proofed to the base flood elevation. Many regulatory standards adopted by communities provide increased protection to new development and redevelopment. Examples of the regulatory standards include:

- **Foundation protection:** Flood and erosion requirements can protect buildings on fill against differential settling as well as scour and erosion.
- **Cumulative substantial improvements:** The NFIP allows improvements valued at up to 50% of the building's pre-improvement value to be permitted without meeting the flood protection requirements. Over the years, a community may issue a

succession of permits for different repairs or improvements to the same structures. This can greatly increase the building's overall flood damage potential.

- **Compensatory storage:** Buildings built on fill and elevated above the base flood elevation meet the NFIP rules. However, when fill or buildings are placed in the floodplain, the flood storage areas are lost and flood heights will go up because there is less room for the floodwaters. This is particularly important in smaller watersheds which respond sooner to changes in the topography.
- **Protecting shorelines:** Regulations that require new floodplain developments to avoid or minimize disruption to shorelines, stream channels, and their banks.
- **Low density zoning:** The fewer structures built in the floodplain, the better. Regulatory standards may zone areas to keep them substantially open. This includes undeveloped land within low density zoning districts, as well as for areas developed in accordance with the density requirements.

Existing permit procedures should be reviewed or revised, as needed, to ensure that the provisions of the ordinances are fully implemented. In addition, permit records should be reviewed to verify that Metro can document enforcement of the ordinances.

Source:	Community Rating System Action Plan
Mitigation Category:	Prevention
Responsible Office:	MWS; Metro Codes
Priority (H, M, L):	Medium
Cost Estimate:	Staff Time
Community Benefit:	Life Safety
Potential funding:	Existing Budget
Schedule:	Within 2 years

2009 Update: *The provisions of the Stormwater Regulations are being fully implemented and enforced.*

RECOMMENDED ACTION 12:

MWS Drainage Maintenance staff should make site visits in response to complaints or inquiries from property owners. Staff should be trained in retrofitting techniques and be comfortable providing retrofitting guidance during site visits.

Source:	Community Rating System Action Plan
Mitigation Category:	Property Protection
Responsible Office:	MWS
Priority (H, M, L):	Medium
Cost Estimate:	$5,000 for 2-day on-site course for staff
Community Benefit:	Reduce losses, complaints, and staff time in responding to complaints
Potential funding:	Existing Budget; TEMA
Schedule:	Within 2 years

2009 Update: *MWS Stormwater staff responds to inquiries concerning flooding complaints. MWS refers the property owner to available FEMA publications on flood proofing and property protection methods.*

RECOMMENDED ACTION 13:

The CPT determined that severe weather hazard mitigation actions and coordination would be best addressed under the goal of public awareness (Goal #2, Recommended Action 15).

The severe weather hazards of drought and wildfire, extreme temperatures, thunderstorms and high winds, tornadoes; and winter storms are recommended to be included in a multi-hazard, seasonal Public Awareness Program.

RECOMMENDED ACTION 14:

Communities that participate in the National Flood Insurance Program (NFIP) often have difficulty determining whether structures meet the NFIP definition of being substantially damaged. This is particularly true after a major flood or other disaster in which large numbers of buildings have suffered damage and there is a pressing need to provide damage determinations so that reconstruction can begin. Structures in Special Flood Hazard Areas that are substantially damaged must be brought into compliance with the minimum requirements of local ordinances and the NFIP. To assist communities in making such determinations, FEMA developed the Residential Substantial Damage Estimator (RSDE) software, which provides guidance in estimating building value and damage costs for both single family and manufactured homes. Based on the regulatory requirements of the NFIP, it is intended to be used in conjunction with industry-accepted residential cost estimating guides.

It is recommended that Metro personnel participate in training in the use of the RSDE program.

Source:	CPT
Mitigation Category:	Prevention
Responsible Office:	OEM
Priority (H, M, L):	Low
Cost Estimate:	$5,000 for 2-day on-site course for staff
Community Benefit:	Improved enforcement of substantial damage regulations; mitigated structures; increased eligibility for ICC (increased cost of compliance)
Potential funding:	Existing Budget; TEMA
Schedule:	Within 2 years

2009 Update: *Nothing new to report at this time.*

RECOMMENDED ACTION 25: (NEW ITEM 2009)

The City of Goodlettsville continues to have problems with flooding and properties continuing to be damaged by floods. The City of Goodlettsville has requested assistance from Metro Government with flood mitigation efforts.

The CPT recommends assisting the City of Goodlettsville with the FEMA repetitive loss buyout program and associated flood mitigation initiatives.

Source:	CPT
Mitigation Category:	Property Protection, Prevention
Responsible Office:	MWS and OEM
Priority (H, M, L):	High
Cost Estimate:	Staff Time
Community Benefit:	Life safety, Potential funding sources for action items of this Mitigation Plan
Potential funding:	Mitigation Funds
Schedule:	Within 2 years

RECOMMENDED ACTION 26: (NEW ITEM 2009)

Colleges and Universities in the area continue to address the need for supplying quick, accurate emergency information to the student body.

The CPT recommends assisting local colleges and universities in obtaining outdoor early warning sirens through grant funding and connecting them to the city's existing early warning siren systems.

Source:	CPT
Mitigation Category:	Property Protection
Responsible Office:	OEM
Priority (H, M, L):	Medium
Cost Estimate:	Staff time, equipment, service expenses
Community Benefit:	Life Safety, Potential funding sources for action items of this Mitigation Plan
Potential funding:	Mitigation Funds
Schedule:	Within 5 years

RECOMMENDED ACTION 27: (NEW ITEM 2012)

The satellite city of Oak Hill (located within Davidson County, TN) is aware of certain areas in their jurisdiction that have historically experienced flooding during significant rain events. In an effort to address these and any other such issues that may exist, Oak Hill has initiated a 3 Phase Drainage Study/Correction Plan (see below). Phase 1 was completed in 2011, Phase

2 anticipated to be completed in 2014, and Phase 3 will depend on the results of Phase 2 and funding availability.

1. Planning (started)
    a. Identify drainage basins
    b. Inventory stormwater infrastructure
    c. Prioritize basin drainage work considering need
2. Model stormwater drainage to determine what work is needed to address issues (not started)
3. Construction of flooding resolution projects (not started)

It is recommended to include this project from The City of Oak Hill in this Multi-Hazard Mitigation Plan as it mirrors actions with Metro Water Services, and applies to the over goal.

Source:	City of Oak Hill
Mitigation Category:	Property Protection, Life Safety, Structural Projects
Responsible Office:	City of Oak Hill
Priority (H, M, L):	Medium
Cost Estimate:	Phase 1 ~ 100k, Phase 2 ~150k, Phase 3 unknown at this time
Community Benefit:	Life Safety, Potential funding sources for action items of this Mitigation Plan
Potential funding:	Existing Oak Hill Budget; Grant Funding
Schedule:	Phase 1 – Completed in 2011 Phase 2 **–** Anticipated completion in 2014 Phase 3 **–** Anticipated start date dependent on funding sources

GOAL #2:	**Promote awareness of hazards and vulnerability among citizens, business, industry and government.**
Objective 2.1:	*Develop a seasonal multi-hazard public education campaign to be implemented annually.*

RECOMMENDED ACTION 15:

Develop and conduct a multi-hazard, seasonal Public Awareness Program that provides citizens and businesses with accurate information describing the risk and vulnerability to natural hazards, and is implemented on an annual basis.

Metro is subject to several natural hazards, each of which pose a different degree of risk and associated vulnerability. Some hazards have a combination of attributes, including a high likelihood of occurrence, specific locations that are likely to be affected, and proven approaches that can reduce the impact; therefore the CPT has recommended specific actions be taken in regards to these hazards. For other hazards, where either the likelihood of occurrence is very low, or the area of likely impact cannot be specified, or there is very little that can be done to reduce the impacts of the hazard, the CPT has determined that the best approach would simply be public awareness. An educational program for the community should include information describing historical events and losses, the likelihood of future occurrences, the range of possible impacts, appropriate actions citizens can take to save lives and minimize property damage, and resources for additional information. Any information provided through this effort should be accurate, specific, timely, and consistent with current and accepted local emergency management procedures as promoted by the Tennessee Emergency Management Agency (TEMA), the Mayor's Office of Emergency Management (OEM), the CRS Public Outreach (Activity 330), and the American Red Cross.

In order to implement a Public Awareness Program, the following actions are recommended:

- Establish a Public Information Committee with the responsibility for developing a Public Awareness Program highlighting the following topics:
    - Wind mitigation techniques such as safe rooms, securing of roofs and foundations, and strengthening garage doors;
    - Information on geological hazards including landslide and sinkhole risk areas;
    - Information on flood hazards and flood insurance; and
    - Winter storm tips including driving and emergency preparedness kits.

- Use a variety of information outlets including local news media, distribution of brochures and leaflets, water bill inserts, websites, and public service announcements. Current brochures and flyers should be put on display in Metro office buildings, libraries, and other public places. In addition, information should be linked to billing e-payments.

- Develop public-private partnerships and incentives to support public education activities, including displaying hazard models at schools, OEM, NWS, Home Depot, Lowes, Homebuilder shows, Realtor organizations, and other events and locations.

- Investigate opportunities to cooperate with the Greater Nashville Association of Realtors in preparing the public information program strategy. Possibilities include developing a real estate agents' brochure or a process whereby real estate agents disclose hazard information to potential property purchasers, for example through the MLS listing services.

- Continue all public information activities currently taking place. Review effectiveness and revise accordingly.

Source:	CPT and Community Rating System Action Plan
Mitigation Category:	Public Information
Responsible Office:	MWS; OEM; Chamber of Commerce; Realtor Board
Priority (H, M, L):	High
Cost Estimate:	$5,000-20,000, depending upon printing and mailing costs, level of volunteer participation, and scope and frequency of events.
Community Benefit:	Life-Safety, Relatively Low Cost, Multi-Hazard program is efficient, relies upon work already accomplished by CPT and others.
Potential funding:	5% state set aside from HMGP funding and PDM funds
Schedule	Part of a seasonal multi-hazard public awareness campaign

2009 Update: *OEM continues to reach out to the public with all hazard information including the current publication "Ready Nashville".*

2012 Update: *Besides the normal face to face outreach, OEM utilizes social media for its outreach efforts before, during and after emergencies. OEM utilizes Metro's website, OEM's Facebook and Twitter accounts.*

Metro has also created a new on-line program for the community called NERVE (Nashville Emergency Response Viewing Engine). This is an interactive mapping site designed to provide timely information relating to natural or man-made emergencies in Davidson County. As an emergency arises, this site will provide information about road closures, evacuation areas and/or routes, shelters and relief centers (i.e. food, water & clothing distribution centers, disaster information centers, disaster recovery centers and more). This site also includes a media tab that includes a Twitter feed from the OEM/EOC, press releases and links to other important information and agencies.

RECOMMENDED ACTION 16:

Metro Water Services should request the state NFIP Coordinator to conduct Agent and Lender Workshops in support of the community's overall NFIP program efforts.

The workshops provide updated program information, responsibilities and requirements for two critical components of the NFIP delivery: insurance agents and lending institutions. Both of these workshops are available through the Technical Assistance provided by the state NFIP Coordinator.

CPT discussions during the development of this plan highlighted two common issues. First, citizens are receiving unclear, mixed, inconsistent or inaccurate information regarding the NFIP and their individual policies. One method of addressing this issue is to ensure that independent insurance agents, the most common source of flood insurance policies and policy information to policy holders, are offered on-going training opportunities to maintain their proficiency regarding the NFIP program and program changes.

Second, since low-interest rates have been available for the past two years, the CPT anticipated, but could not verify, that there would be an increase in the number of flood insurance policies in force as people either refinanced their homes or took out other home-equity loans, which would trigger the mandatory flood insurance purchase requirement on federally backed mortgages. One method of addressing this issue is to ensure that lending institutions, the most common source of federally backed mortgages, are offered on-going training opportunities to maintain their proficiency regarding the NFIP program and their responsibilities within that program.

Source:	CPT
Mitigation Measure:	Prevention
Responsible Office:	Metro Water Services
Priority:	High
Cost Estimate:	Staff time for workshop coordination and delivery
Community Benefit:	Increased policy base and more accurate information regarding policy coverage's by the policy holder.
Potential Funding:	None required. This is a service of the state NFIP Coordinator.
Schedule:	2010

RECOMMENDED ACTION 17:

MWS currently sends an annual mailing to the approximate 10,000 properties located within the 100-year floodplain.

It is recommended that MWS Stormwater Division continue the mailing and that the mailing be modified to include other natural hazards of concern that have been identified through the hazard mitigation planning process.

Source:	Community Rating System Action Plan
Mitigation Category:	Public Information
Responsible Office:	MWS
Priority (H, M, L):	Medium
Cost Estimate:	Staff time is required to produce and review approximately 10,000 individual digital pamphlets. The pamphlets must be printed, folded, sealed, and posted in accordance with US Postal Service requirements. Assume one week of staff time in addition to approximately $5,000 in printing and postage costs.
Community Benefit:	The annual mailing is distributed to all properties of the SFHA and those additional areas known to have flooding problems. The notice clearly explains that the recipient's property is subject to flooding. The mailing recommends flood insurance coverage and protection measures undertaken by building-owners.
Potential funding:	Existing Budget
Schedule:	Annually

2009 Update: *MWS continues to send these notices to properties in the 100 year floodplain on an annual basis to approximately 10,000 parcels.*

RECOMMENDED ACTION 18:

According to insurance agents, one of the greatest impediments to selling flood insurance is the difficulty of obtaining accurate flood insurance rating zone and building elevation data. By providing this data on the community website, the information is readily accessible to any inquirer (e.g., no payment of money is needed). The elevation certificates may be in the form of a searchable database, scanned elevation certificates, or any other format that makes the data available. Additionally, the relatively low setup cost would be more than paid for by the reduced staff time needed to retrieve elevation certificate data and answer questions from inquirers. By referring people to the website, staff would be free to handle technical issues and permit reviews.

Discussions should be held with Metro website staff on the best way to post Elevation Certificate data on the website and procedures to maintain the data.

Source:	CPT and Community Rating System Action Plan
Mitigation Category:	Public Information
Responsible Office:	MWS
Priority (H, M, L):	Low
Cost Estimate:	Staff Time
Community Benefit:	Public Information
Potential funding:	Existing Budget
Schedule:	Within 2 years

2009 Update: *At this time, Elevation Certificates are not available through the web site.*

GOAL #3:	**Maximize use of available funding.**
Objective 3.1:	*Identify multiple objective opportunities that can be used to support mitigation activities.*
Objective 3.2:	*Identify and analyze project cost share options.*
Objective 3.3:	*Submit mitigation project applications annually at a minimum.*

RECOMMENDED ACTION 20:

A flood threat recognition system tells emergency management officials that a flood is imminent. Examples of systems include river stage predictions from the National Weather Service and using local gauges to predict flood crests and times. Flood crest prediction programs are currently in place on the Cumberland and Harpeth Rivers.

The Mayor's Office of Emergency Management (OEM), with help from the MWS Stormwater Division's engineers, should review the costs and benefits of developing flood crest prediction programs for other streams with reporting gauges.

There are more rain and river gauges on smaller streams and additional work would be needed to translate readings into a crest prediction for these areas. These gauges include Mill Creek at Antioch, Browns Creek at the State Fairgrounds, and Whites Creek at Bordeaux.

Source:	Community Rating System Action Plan
Mitigation Category:	Emergency Services
Responsible Office:	OEM in conjunction with MWS
Priority (H, M, L):	Medium
Cost Estimate:	One half (½) day of staff time for documentation of the Cumberland and Harpeth River gauges; $10,000 to develop crest prediction programs for other streams. Additionally there is an existing cost of $165,000 for current monitoring efforts. This cost is shared equally by Metro and the USGS.
Community Benefit:	Public Safety
Potential funding:	NWS; USGS; HMGP, FMA
Schedule:	Within 5 years

2009 Update: *Mill Creek at Bluff and Nolensville Road is complete. Further surveying needs to be completed in the Antioch area and along other creeks.*

2012 Update: *After the Flood of May 2010, there was a combined effort from the US Geological Survey (USGS), National Weather Service (NWS), Metro Water and Nashville OEM to install river gauges at flood prone waterways in Davidson County. Data from these gauges is made available to local authorities for action as needed. The USGS supplied the gauges and is responsible for the maintenance. Along with these gauges, there are 2 fixed*

post cameras, and 2 mobile cameras to monitor flood levels. (This update also goes with Recommended Action #8)

RECOMMENDED ACTION 21:

Dams can create a false sense of security for floodplain residents. Unlike levees, they do not need flood conditions to fail. They can be breached with little or no warning and send a wall of water downstream. The combination of high velocity, great depth, and short notice has proven particularly deadly and destructive. One way to minimize this hazard is to enforce construction and maintenance standards. This is usually done through a state dam safety program.

Tennessee state law exempts "farm ponds" from state regulations. The Tennessee Department of Environment and Conservation reports that of the 1,100 dams in the state, over 500 qualify as farm ponds, which are any privately owned dams that are not open to the public.

There are 16 such farm pond dams in Davidson County, eight of which are considered "high hazard" dams. "High hazard" means that their failures would likely kill or injure someone. Since 1973, thirty-seven dams in Tennessee have failed. Thirty-three were unregulated.

Metro officials should talk to their state legislators and Tennessee Department of Environment and Conservation staff about the feasibility of amending the State's dam safety laws.

Source:	Community Rating System Action Plan
Mitigation Category:	Emergency Services
Responsible Office:	MWS and OEM
Priority (H, M, L):	Low
Cost Estimate:	Staff Time; because changing a state law involves political contacts and discussions, a cost for technical staff time or consultant expenses cannot be estimated. It would take one to two days to prepare a background paper on the issues.
Community Benefit:	Public Safety
Potential funding:	Existing Budget
Schedule:	Within 5 years

2009 Update: *Tennessee's safe dam program does not include farm ponds.*

RECOMMENDED ACTION 22:

Cooperating Technical Partners (CTPs) are communities, regional agencies, or states that have the interest and capability to be active partners in FEMA's flood mapping program. CTPs enter into an agreement that formalizes their contribution and commitment to flood mapping. The objective of the program is to maximize limited funding by combining resources and help maintain consistent national standards.

Metro's Stormwater Division should pursue a Cooperating Technical Partner agreement with FEMA in order to get its mapping standards to better fit local conditions or make the community a higher priority for mapping support.

Source:	Community Rating System Action Plan
Mitigation Category:	Prevention
Responsible Office:	MWS
Priority (H, M, L):	Low
Cost Estimate:	Staff Time
Community Benefit:	Formalization of community contribution and commitment to flood mapping. CTP program maximizes limited funding by combining resources and helps to maintain consistent national standards.
Potential funding:	Existing Budget
Schedule:	Within 5 years

RECOMMENDED ACTION 23:

Develop a financial strategy to design and construct large capital improvement projects.

The strategy shall incorporate a cost-sharing plan to leverage local, state, and federal funding for stormwater management activities and projects.

Source:	Floodplain Management Plan
Mitigation Category:	Structural Projects
Responsible Office:	MWS
Priority (H, M, L):	Low
Cost Estimate:	$40,000
Community Benefit:	Life Safety
Potential funding:	Existing Budget; TEMA
Schedule:	2005

2009 Update: *Beginning July 1, 2009, Metro implemented a Stormwater User fee where all properties in Davidson County that have more than 400 square feet of impervious surface pay a monthly user fee. (The seven incorporated satellite cities within the county are not in the program.) The funds collected through this fee pay the operation expenses of the Stormwater Division and support a $12M/year capital construction program.*

RECOMMENDED ACTION 24:

FEMA offers two programs, the Hazard Mitigation Grant Program (HMGP) and the Flood Mitigation Assistance (FMA) Program, to assist local communities with reducing future losses of lives and properties due to disasters. The HMGP provides grants to local communities to implement long-term hazard mitigation measures such as the elevation,

acquisition, or relocation of flood-prone structures after a major disaster declaration. The FMA program provides grants to communities for projects that reduce the risk of flood damage to structures that have flood insurance coverage. FEMA's mitigation grant programs are administered by the TEMA, which prioritizes and selects project applications developed and submitted by local jurisdictions.

The CPT recommends applying annually for potentially available HMGP and FMA grants.

Source:	CPT
Mitigation Category:	Property Protection; Structural Projects
Responsible Office:	MWS and OEM
Priority (H, M, L):	Low
Cost Estimate:	Staff Time to complete grant application
Community Benefit:	Potential funding sources for action items of this Mitigation Plan
Potential funding:	Existing Budget
Schedule:	Annually

2009 Update: *MWS has a close working relationship with TEMA and MWS has applied for and been awarded funding from both HMGP and FMA on an annual basis. Since 2002, MWS has acquired and removed 52 homes from the 100 year floodplain.*

2012 Update: *Post May 2010 Flood, the MWS applied for $46.7 million in HMGP funds to acquire 244 properties. Since May 2010, MWS has purchased 197 homes, and 120 homes have been demolished.*

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COMPLETED ACTION ITEMS

Recommended mitigation action items from several existing community plans have already been implemented by Metro. This demonstrates not only the current capability of Metro to counter identified hazards through existing policies, regulations, programs, and procedures, but also the ongoing commitment of Metro to protect the community and mitigate the damaging effects of hazards. Completed action items since 2005 are presented below.

COMPLETED ACTION 1:

Develop a plan and schedule to modify and enhance the existing floodplain management regulations with the intent of minimizing future flooding within the floodplain.

Source: Floodplain Management Plan
Responsible Office: MWS
Status: A Stormwater Regulation Review Committee was formed to advise Metro Water Services on revisions and enhancements to stormwater management regulations and associated processes.

COMPLETED ACTION 2:

Develop formalized policies (level-of-service and extent-of-service) for maintenance of the stormwater drainage system.

Source: Floodplain Management Plan and Community Rating System Action Plan
Responsible Office: MWS
Status: Draft policies addressing level-of-service and extent-of-service have been prepared in order to define the areas where maintenance work will be performed by MWS Stormwater Division staff.

COMPLETED ACTION 3:

Develop a GIS database of all stormwater detention structures and BMP facilities within Metro Nashville and Davidson County. Upon completion of database, develop a routine maintenance schedule to ensure proper detention and water quality functions of stormwater facilities.

Source: Floodplain Management Plan
Responsible Office: MWS
Status: The GIS database was completed in 2003 based upon the available data through 2002. A maintenance schedule using the GIS database was initiated in June of 2004. The MWS Stormwater Division Maintenance Staff estimate that they inspect 100 stormwater structures each month. The inspection program is performed in conjunction with system maintenance for documentation purposes.

COMPLETED ACTION 4:

Double the number of stormwater infrastructure maintenance crews (four to eight) that handle maintenance problems and dedicate appropriate equipment to perform maintenance.

Source: Floodplain Management Plan
Responsible Office: MWS
Status: The MWS Stormwater Division currently employs eight maintenance crews. The crews are assigned to large ditch maintenance, stormwater inlet construction, stormwater inlet cleanout, and masonry.

COMPLETED ACTION 5:

Metro should begin a practice to place deed restrictions on all flood-prone lands purchased with public funds.

Source: Community Rating System Action Plan
Responsible Office: MWS
Status: Deed restrictions have been revised and/or placed on all floodprone lands purchased with public funds as a part of the CRS annual review and update.

COMPLETED ACTION 6:

Develop GIS database of insurable structures within the designated floodplain, particularly including the repetitive loss areas. The database shall contain detailed structure elevation and floodplain data.

Source: Floodplain Management Plan
Responsible Office: MWS
Status: Developed for the repetitive loss homeowner mailouts, a database of parcels and structures located in the floodplain has been linked to existing elevation certificate information. This information is provided to all homeowners located in the floodplain on an annual basis. Approximately 10,000 homeowners currently receive a residence-specific mailout.

COMPLETED ACTION 7:

Initiate a multi-year comprehensive watershed study for Mill Creek, the largest watershed in Davidson County, Mill Creek. Repetitive loss areas are identified on Mill Creek mainstem and two tributaries, Sevenmile Creek and Whittemore Branch. The watershed study will identify flooding problems and develop capital improvement projects to remedy flooding problems.

Source: Floodplain Management Plan
Responsible Office: MWS

Status: The US Army Corps of Engineers, Nashville District, in conjunction with a contractor, will complete floodplain inundation mapping and floodway analysis for the following streams in the Mill Creek Watershed: Mill Creek, Sevenmile Creek, Sorghum Branch, Whittemore Branch, Sims Branch, Tributary A, Tributary B, Collins Creek, Turkey Creek, Indian Creek, and Holt Creek. The watershed study will be the first study to utilize new HEC software, HEC-HMS version 3.0. The 107 square mile watershed is subdivided into 129 subwatersheds that are further broken down into 200-meter grids (10 acres). Each grid is defined with unique parameters, such as impervious surface area, loss rates, and land use that have been derived from existing Metro GIS data. Newly developed GIS tools will use watershed management practices for stormwater and planning purposes.

RECOMMENDED ACTION 19:

Due to the historically perceived threat of nuclear attack, fallout shelters have been designated throughout Davidson County.

The CPT recommends completing an inventory of these existing shelters and utilizing them as "tornado safe" places and shelters. The inventory should be published for community access.

Source:	CPT
Mitigation Category:	Emergency Services; Public Information
Responsible Office:	OEM
Priority (H, M, L):	Low
Cost Estimate:	Staff Time
Community Benefit:	Life Safety
Potential funding:	Existing Budget; TEMA
Schedule:	Within 2 years

2009 Update: *Due to legality concerns, this recommended action will not be implemented.*

RECOMMENDED ACTION 8:

Metro's emergency management program, in conjunction with Public Works, has installed several flood-warning gauges in some county streams and creeks. The coverage of these gauges is for only three of the county's 14 repetitive flooding creeks and streams.

An additional 11 gauges are recommended for total coverage of the community.

Source:	OEM Local Hazard Mitigation Plan
Mitigation Category:	Emergency Services
Responsible Office:	OEM
Priority (H, M, L):	Medium
Cost Estimate:	$10,000 - $15,000 annual maintenance
Community Benefit:	Improved warning, increased lead time on warning systems and mitigation efforts, reduced losses, life safety
Potential funding:	Coordinate with NPDES gauging needs where possible; USGS

Schedule: Within 5 years

2009 Update: *This action item is being amended to include the recommendation of a flood gauge on Mansker Creek in Goodlettsville (automatic notification gauge). MWS has re-installed hardware for the alarm system at the Dry Creek flood control structure and the alarm will alert MWS and OEM; this was conducted using 100% local funding. Manually staff gauges were installed in 2009 at Mill Creek and in the process of being installed at Seven Mile Creek.*

2012 Update: *After the Flood of May 2010, there was a combined effort from the US Geological Survey (USGS), National Weather Service (NWS), Metro Water and Nashville OEM to install river gauges at flood prone waterways in Davidson County. Data from these gauges is made available to local authorities for action as needed. The USGS supplied the gauges and is responsible for the maintenance. Along with these gauges, there are 2 fixed post cameras, and 2 mobile cameras to monitor flood levels. (This update also goes with Recommended Action #20.)*

There is a new program called 'SAFE' (Situational Awareness for Flooding Events) that Nashville utilizes. It is a partnership between Metro Water, Nashville OEM, Metro Planning, US Army Corps of Engineers, the USGS and the National Weather Service. The expertise and data from each of these agencies is collectively used to monitor and predict watershed conditions. This program allows Metro to monitor actual and forecasted river stages and acquire information that can be used to dispatch resources and respond more efficiently to flood related emergencies. This information will be used to alert emergency personnel to the threat or actual danger of flooding, and not as a warning system for the general public. There are currently 28 gauges installed. This information gets mapped to a mapping program developed by Metro Planning and displays resulting inundation areas and impacts associated with current and predicted flooding.

The Nashville SAFE program is focused on the six major watersheds within Metro Nashville: Cumberland River, Harpeth River, Mill Creek, Richland Creek, Whites Creek, and Browns Creek.

OTHER ACTION ITEMS CONSIDERED

Not all of the mitigation actions presented to and/or discussed by the CPT became recommended action items. Action items may not have been considered to be cost-effective or support the community's goals. Additionally, action items may have lacked political support, constituent support, and funding. Action items not recommended or included in the priority list are presented below for each identified hazard.

GEOLOGICAL HAZARDS

As previously noted, steep slopes, present throughout the Metro area, specifically in south-central Davidson and north-central Williamson Counties, have the potential to be unstable. Landslides have also occurred in this area due to construction-altered colluvium soils on steep slopes adjacent to the Highland Rim escarpment. The CPT discussed the following potential mitigation measures to address these geological hazards:

- Require a stronger, institutionalized methodology of identifying "at risk" soils;
- Require geotechnical studies and engineered solutions for "at risk" soils or "critical sites";
- Identify site specific road-cut issues for county, state, and private roadways; and
- Create standard road-cut designs for specific slopes and/or given soils.

Assessment: The CPT determined geological hazards within the metropolitan area are adequately addressed through notification of the known hazards to grading permit applicants during the plans review process. The CPT did not feel the historical losses from geological hazards were significant enough to warrant additional regulation and expense on the community.

SEVERE WEATHER HAZARDS

Severe weather hazards within the Metro area include drought, extreme temperatures, thunderstorms and high winds, tornadoes, and winter storms. Severe winter storms and tornadoes have been among the causes of significant losses to the community resulting in presidential disaster declarations. The CPT discussed the following potential mitigation measures to address severe weather hazards:

- Improvements to the severe weather warning system.

Assessment: The CPT determined the recently updated warning system of 71 outdoor warning siren locations within the community -- although adequate -- can still be expanded. Additional public education efforts would be better suited to inform the community of the warning system and appropriate emergency response actions. See Recommended Action Item #15.

2012 Update: As of this revision, Metro has 73 sirens. Metro Nashville has issued an RFP in July 2012 for adding approximately 20 new sirens, and upgrading the current outdoor early warning siren system. This would give almost 100% coverage for the jurisdiction. Expected completion date is 2013, at a capital funding cost of approximately two million dollars.

- Construct tornado saferooms and/or seek vendor donation of one model saferoom.

Assessment: The CPT preferred the use of existing fallout shelters, previously constructed due to the historically perceived threat of nuclear attack, to the new construction of tornado saferooms. See Recommended Action Item #19.

2009 Update: Due to legality concerns, this recommended action will not be implemented.

Assessment: The CPT determined the existing urban forester, currently working within the Metro Codes Department, sufficiently enforces the landscape ordinances at the present time.

- Continue development of tree-trimming program to lessen the risk of power outages by falling limbs.
- Update vegetation ordinances (i.e., urban forester, landscape ordinances, supplement NES program)

Assessment: The CPT the tree-trimming program operated by the Nashville Electric Service adequately served the community.

- NES continues development of tree-trimming program to lessen the risk of power outages by falling limbs.

FLOODING HAZARD

Within Metro Nashville, projects that are required to implement stormwater management practices must provide a detention facility. According to the 1999 *Metro Stormwater Management Manual*, the release rate from any detention facility should approximate that of the site prior to the proposed development for the 2-year through 10-year storms, with emergency overflow capable of handling at least the 100-year discharge. The CPT discussed the following potential mitigation measures to address stormwater management practices:

- The MWS Stormwater Division should review its standards to determine if storm events larger than the 10-year event should be managed in retention basins.

Assessment: The CPT did not consider this action item a priority for the Multi-Hazard Mitigation Plan. The action item did not receive any "stars" during the prioritization of preferred measures. The CPT found this action item established an undue regulation on the community, that the probability of storm events larger than the 10-year were not balanced by the life of the structure itself. Upon further discussion, the CPT determined the flooding hazard was sufficiently addressed in the other developed action items.